



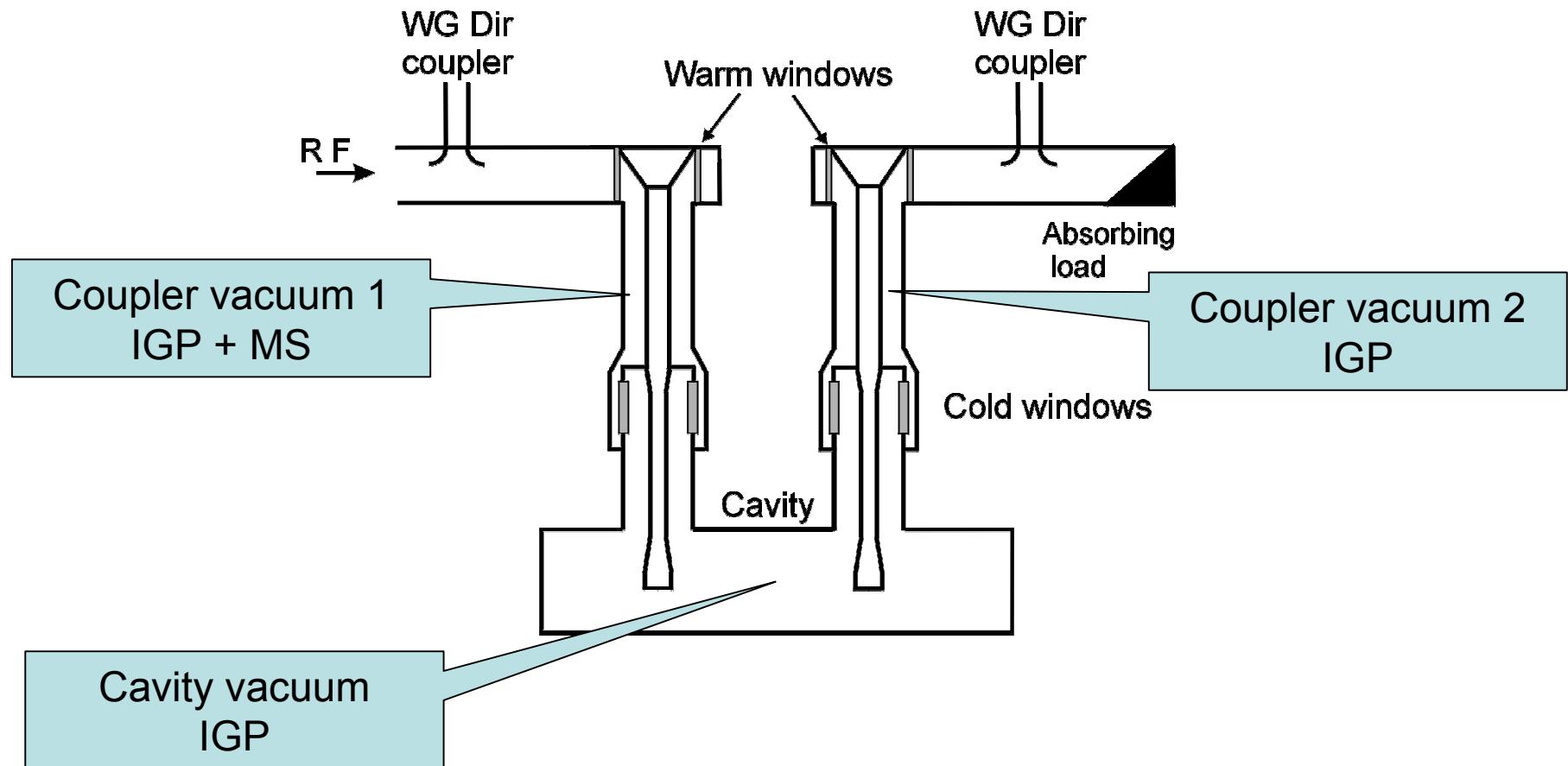
# Residual gas analysis during the coupler processing

Denis Kostin, MHF/sl, DESY

# Contents

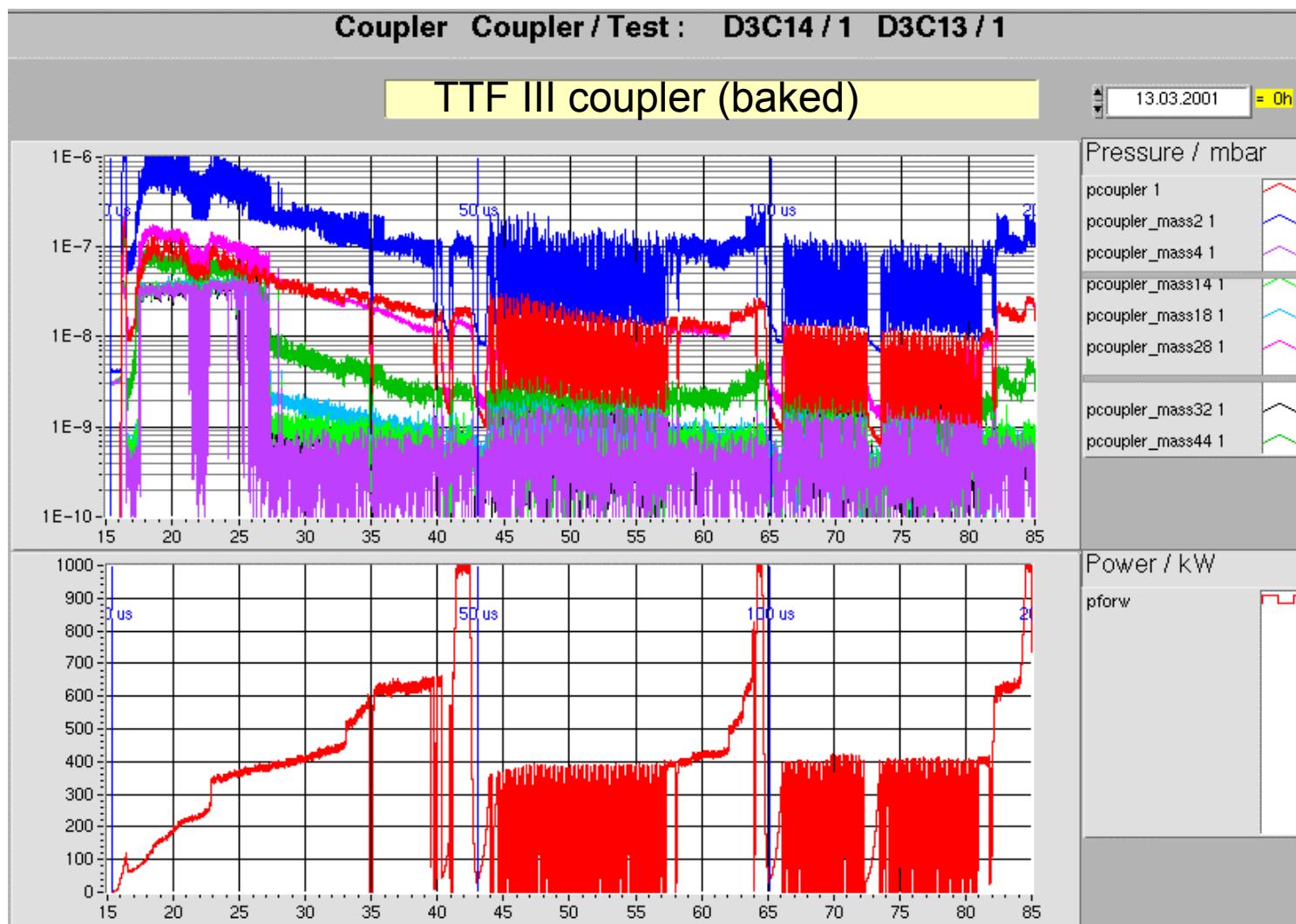
1. Coupler test stand
2. Horizontal cavity test stand
3. Accelerating modules @ TTF
4. Other Labs
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# 1. Coupler test stand



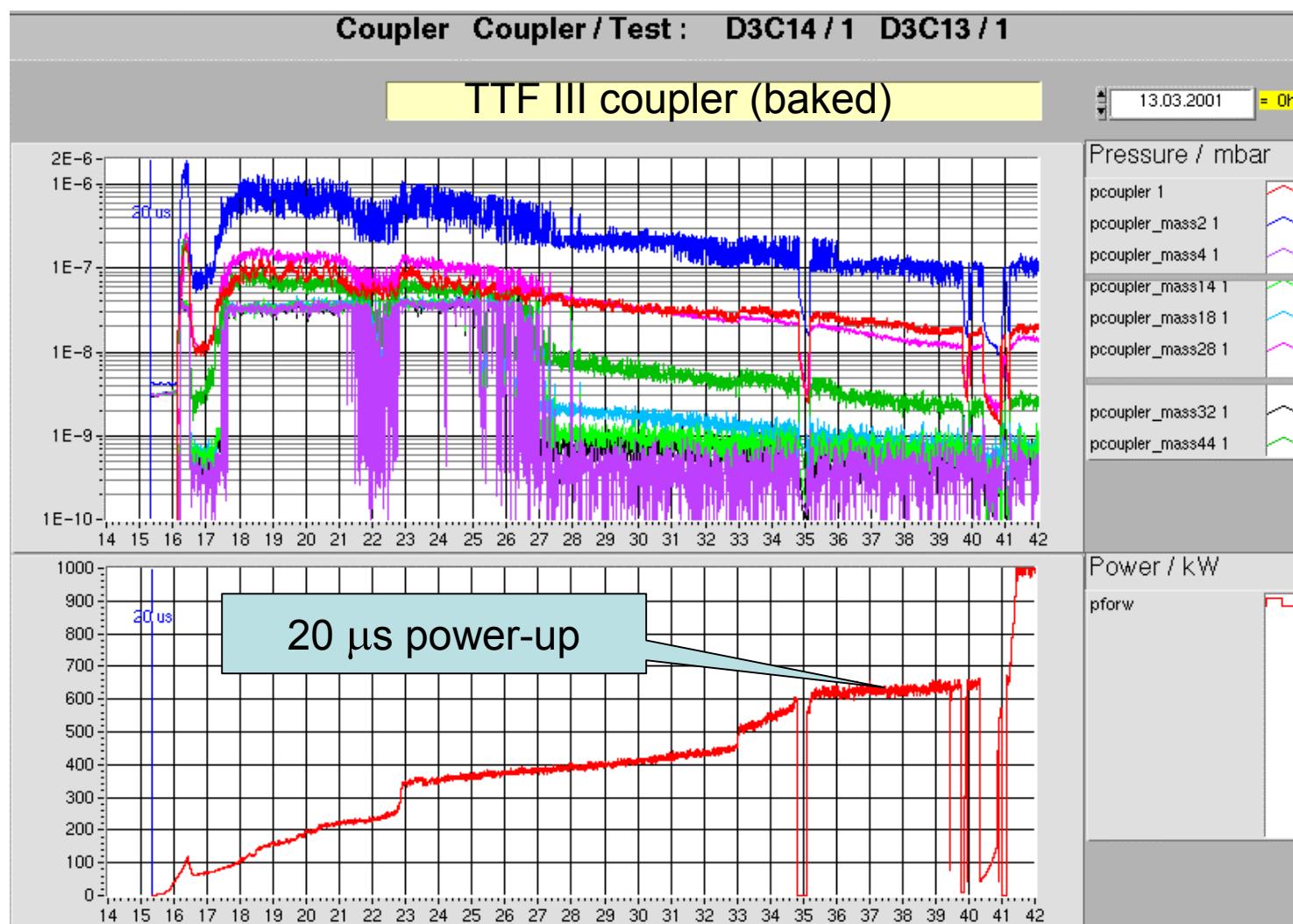
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# Mass Spectra (1.1)



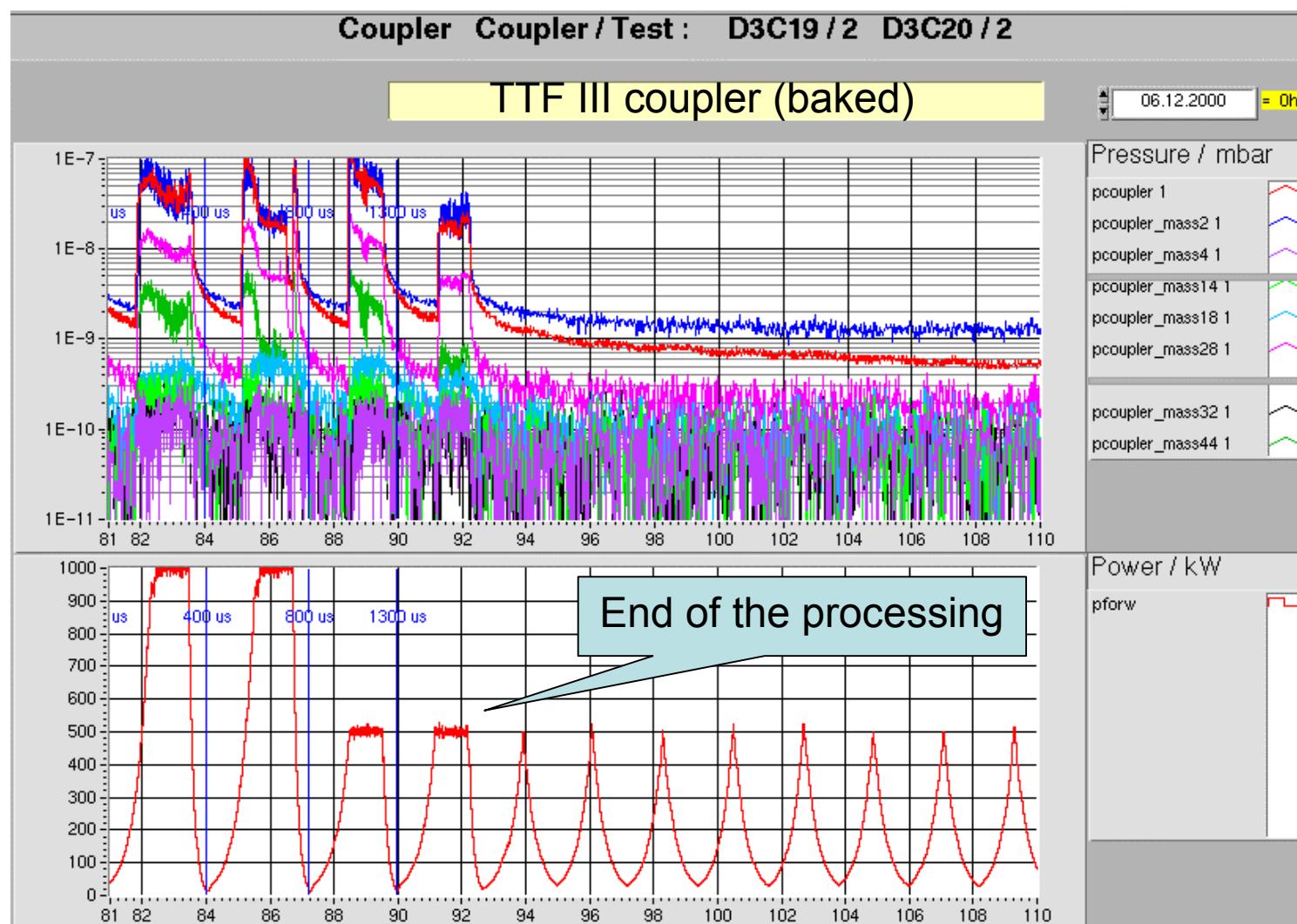
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# Mass Spectra (1.2)



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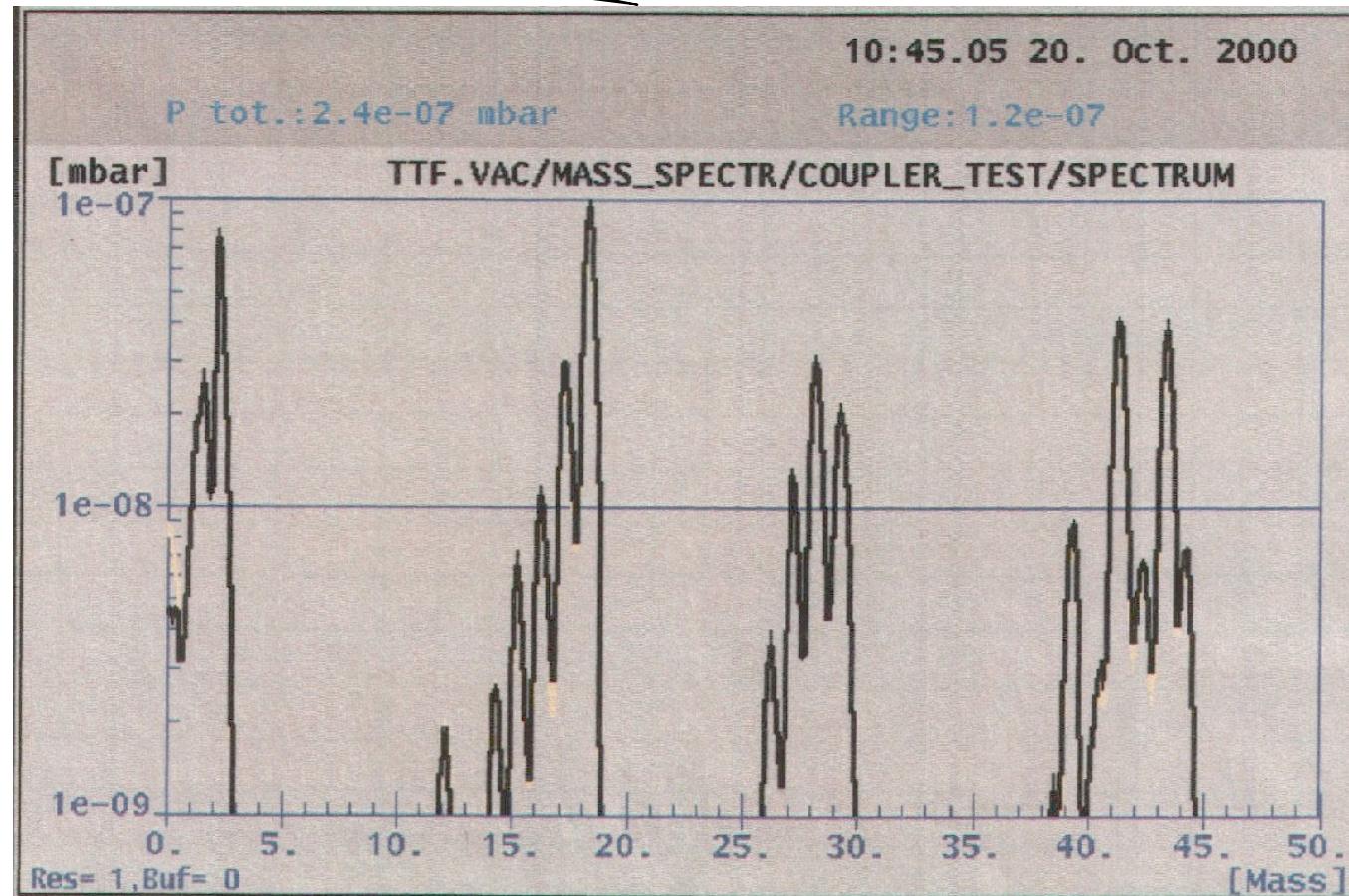
# Mass Spectra (1.3)



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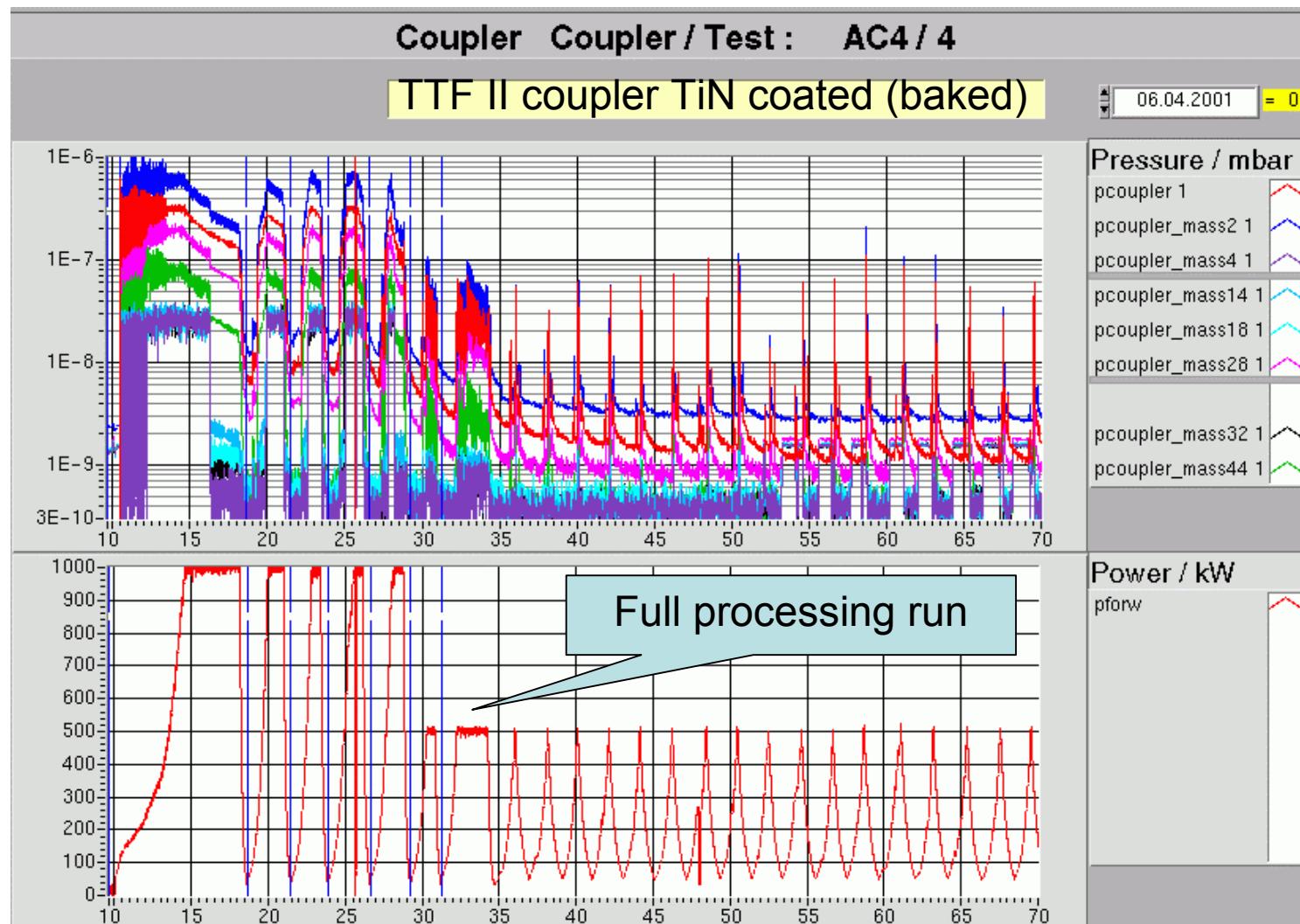
# Mass Spectra (1.4)

RF ON: first power-up



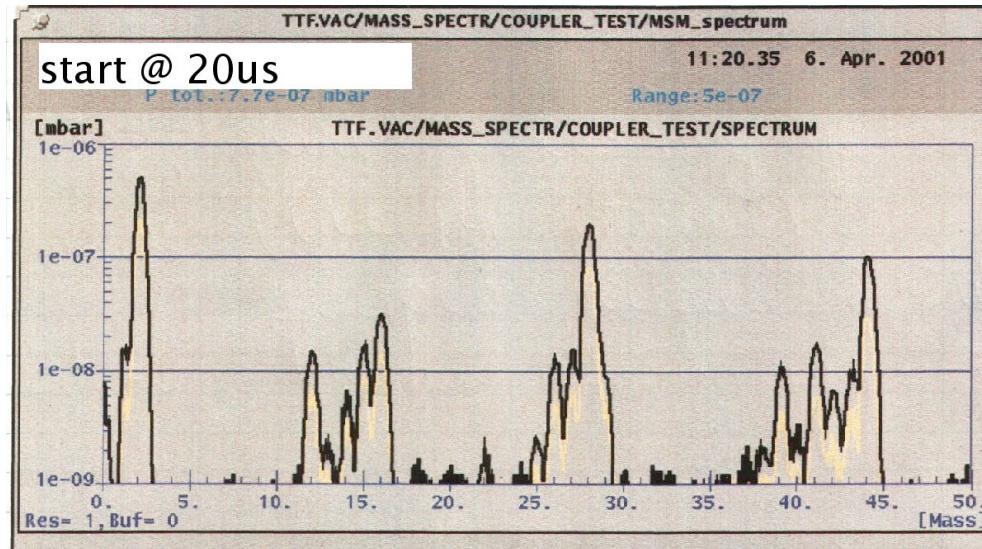
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# Mass Spectra (1.5)

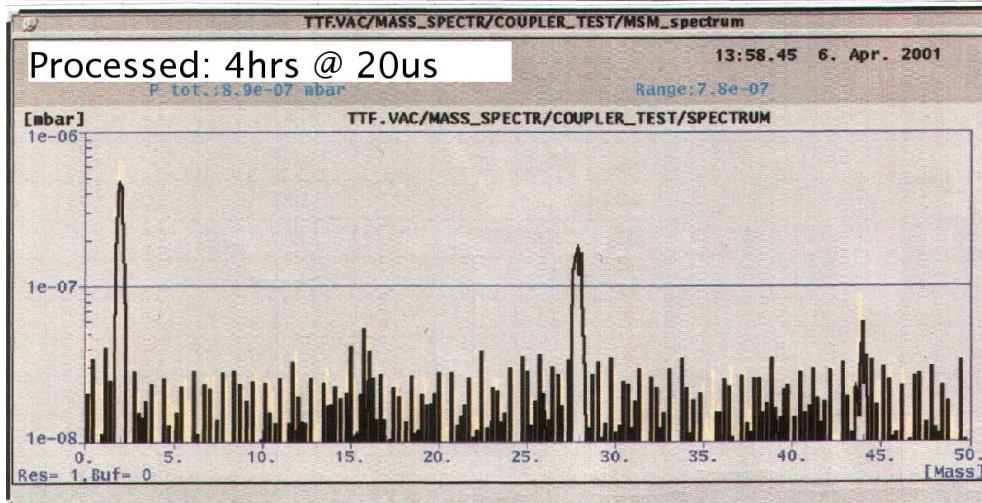


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# Mass Spectra (1.6)

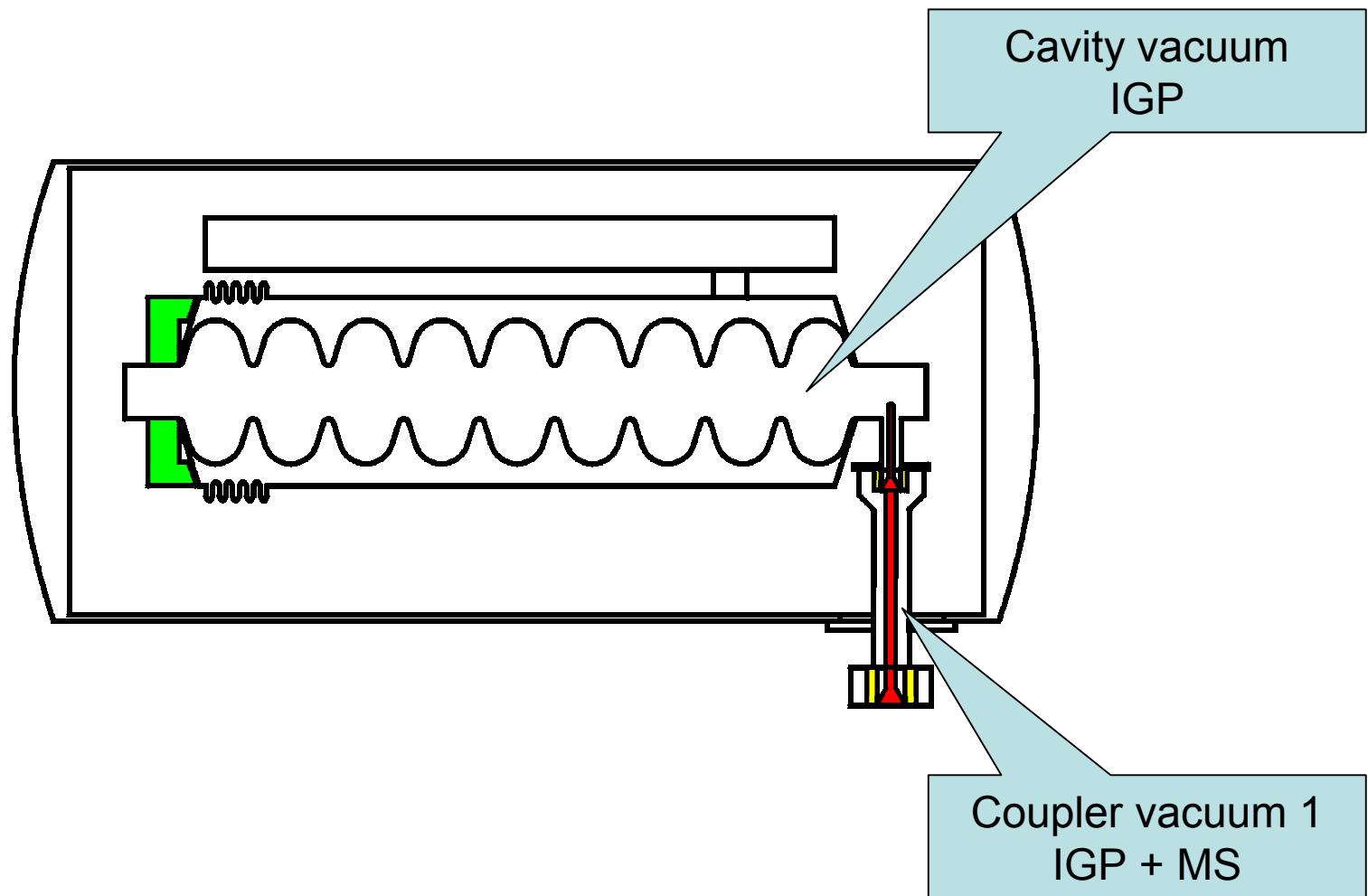


TTF II coupler  
TiN coated  
(baked)



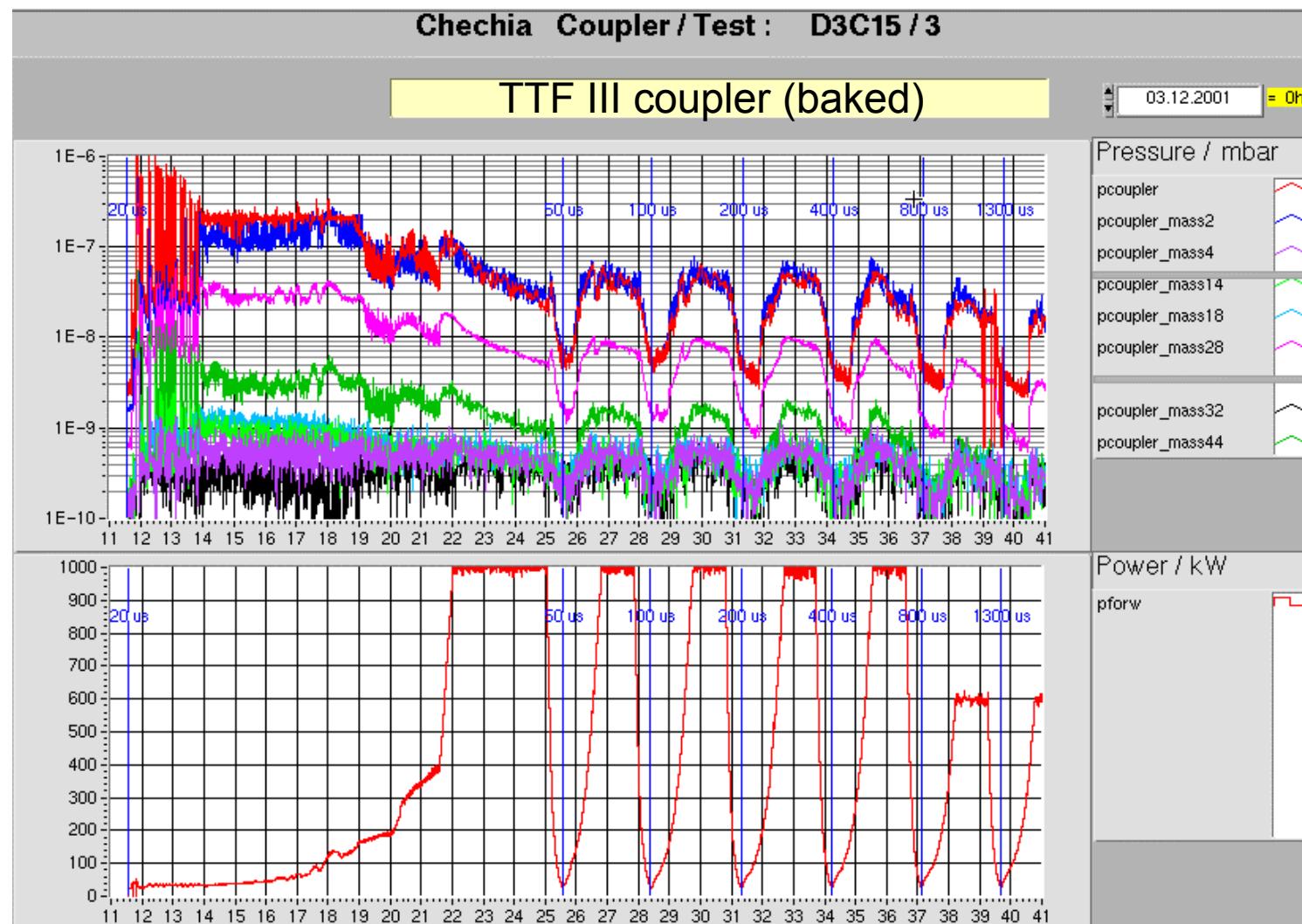
Denis Kostin, MHF/sl, DESY

## 2. Horizontal cavity test stand



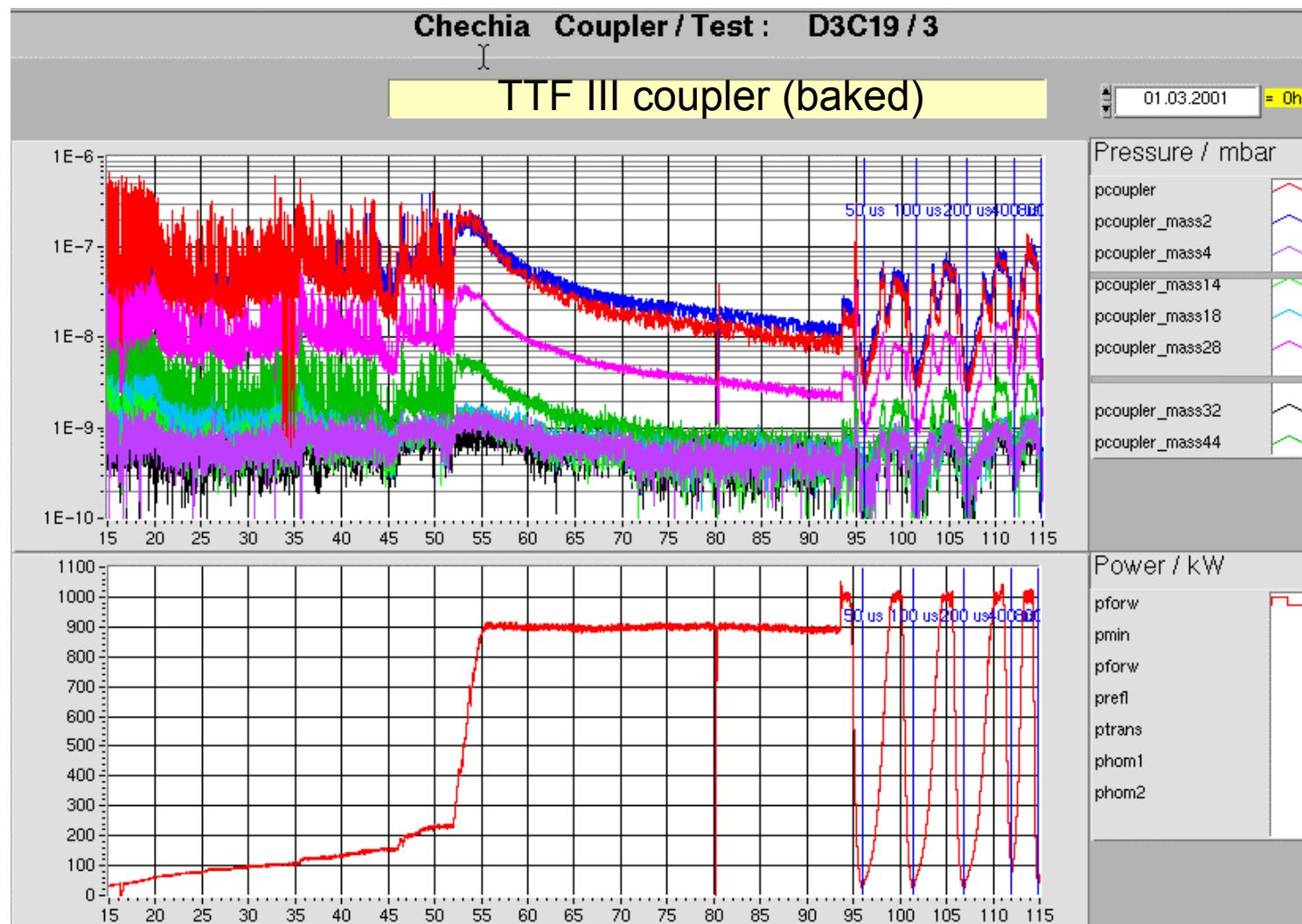
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# Mass Spectra (2.1)



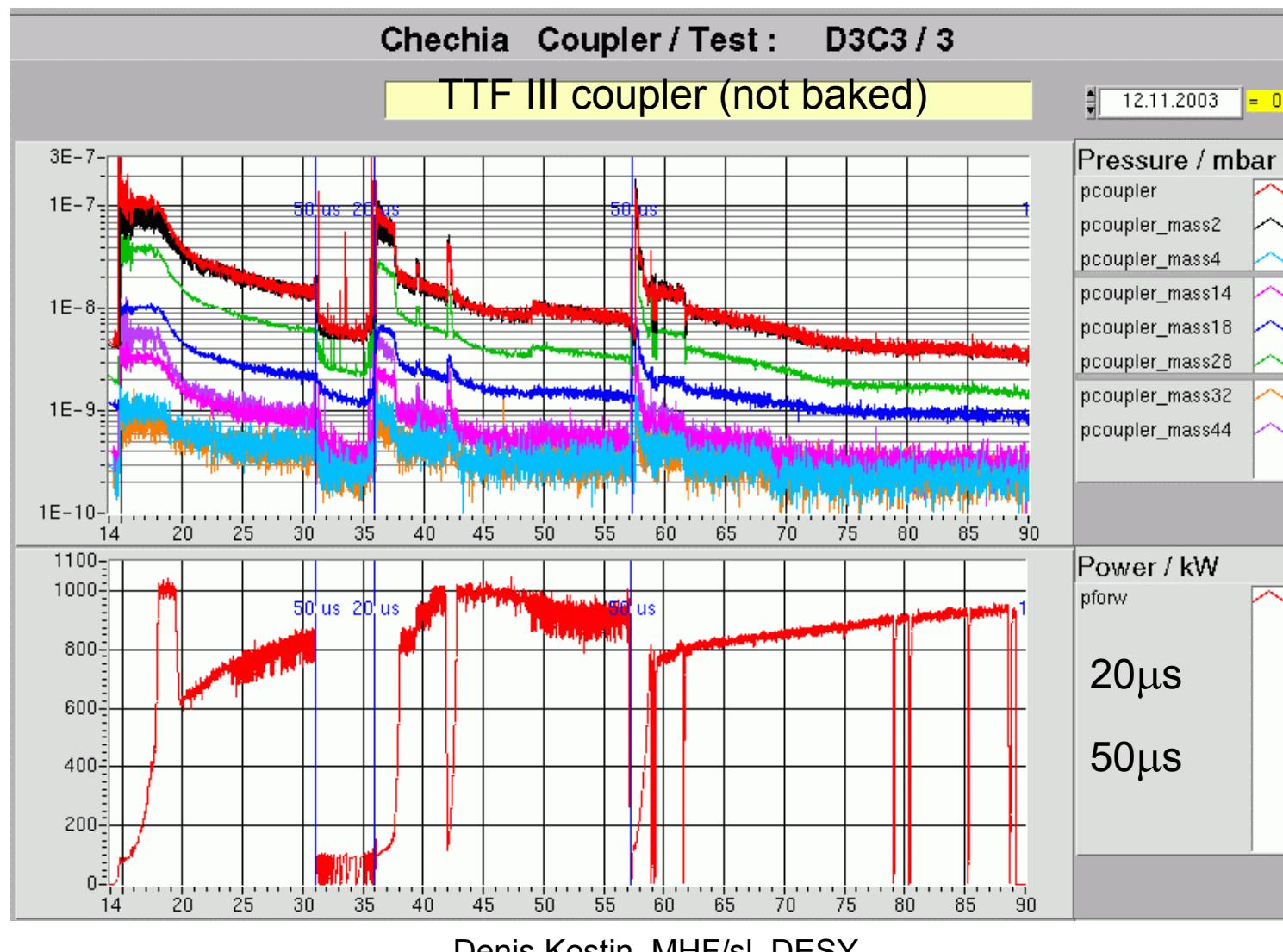
Denis Kostin, MHF/sl, DESY

# Mass Spectra (2.2)

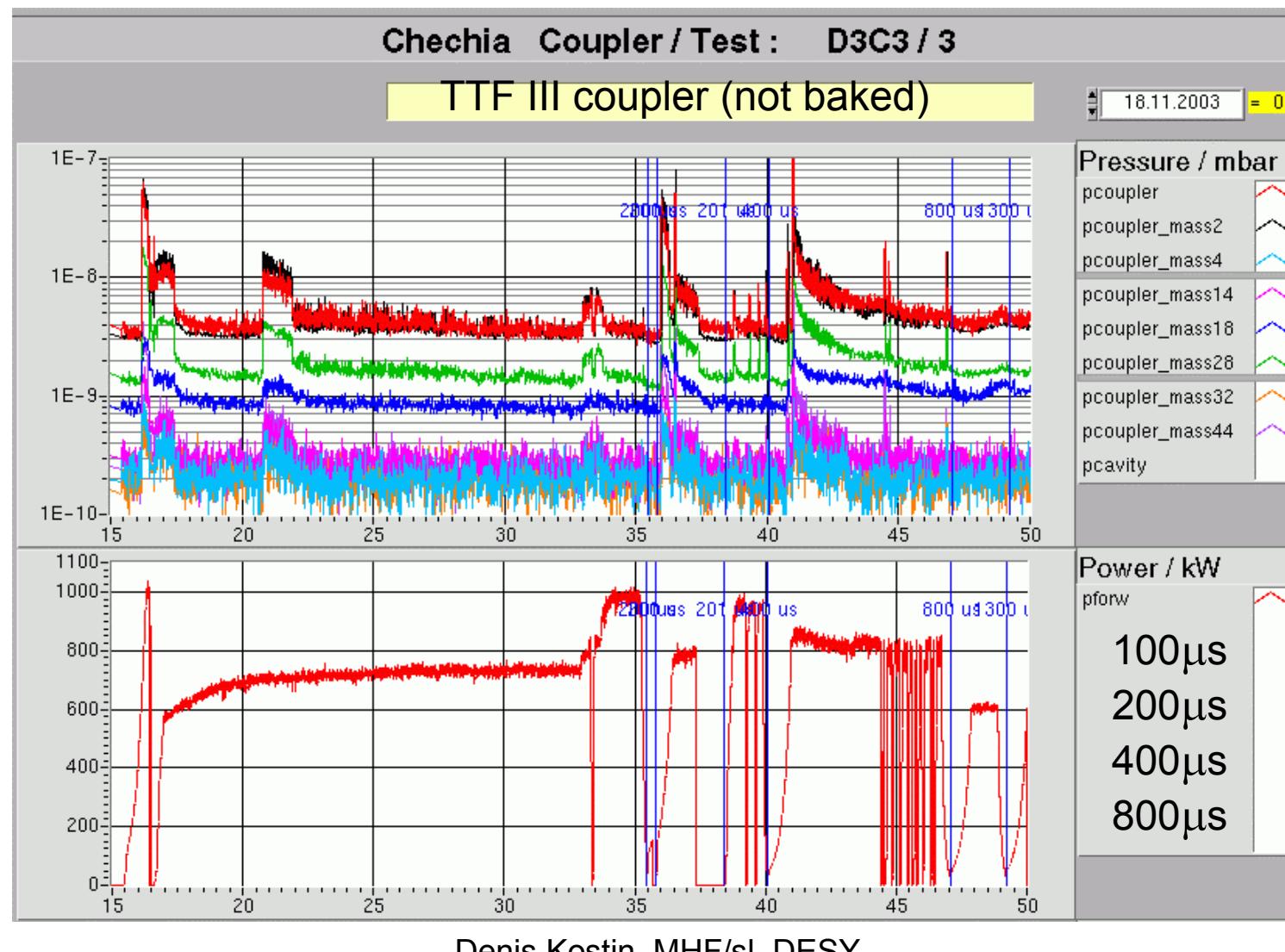


Denis Kostin, MHF/sl, DESY

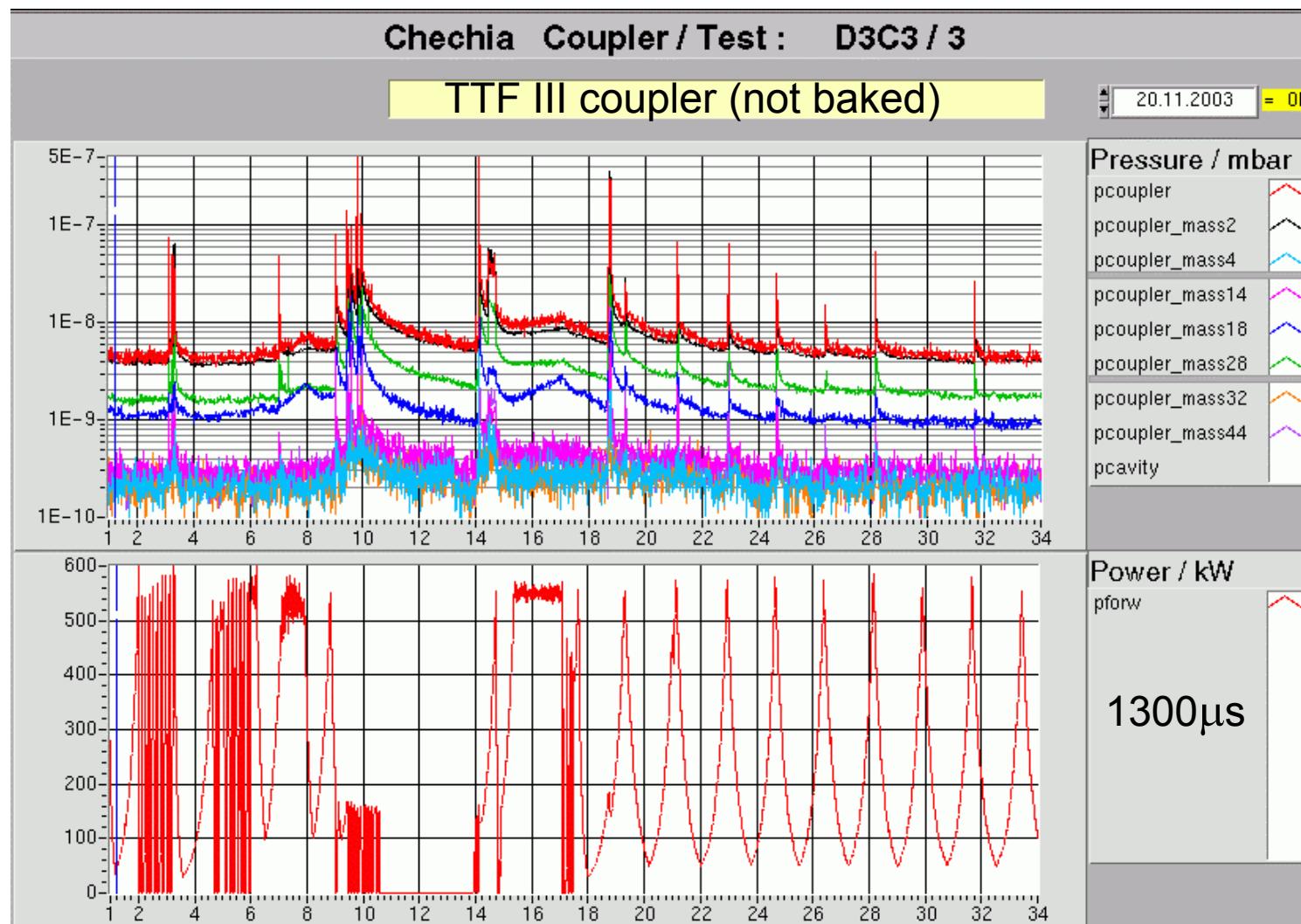
# Mass Spectra (2.3)



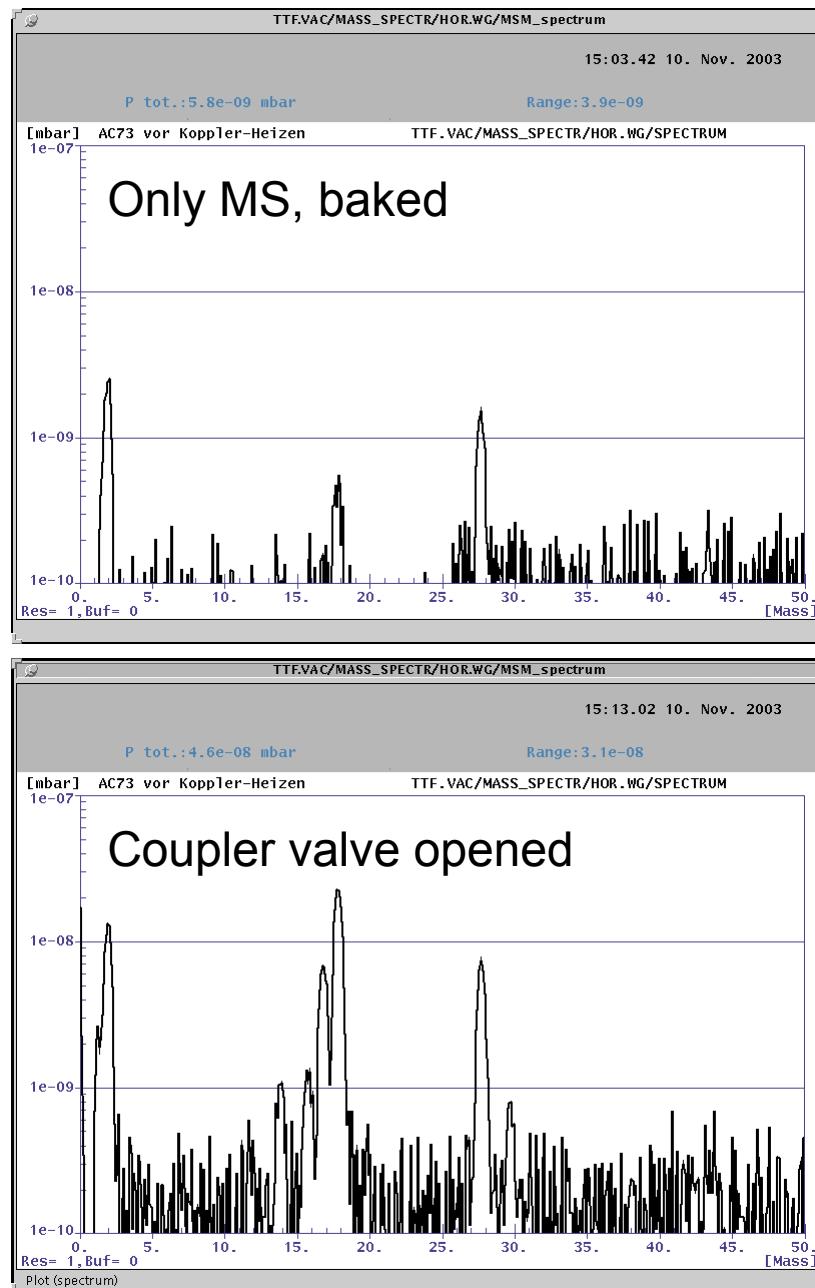
# Mass Spectra (2.4)



# Mass Spectra (2.5)

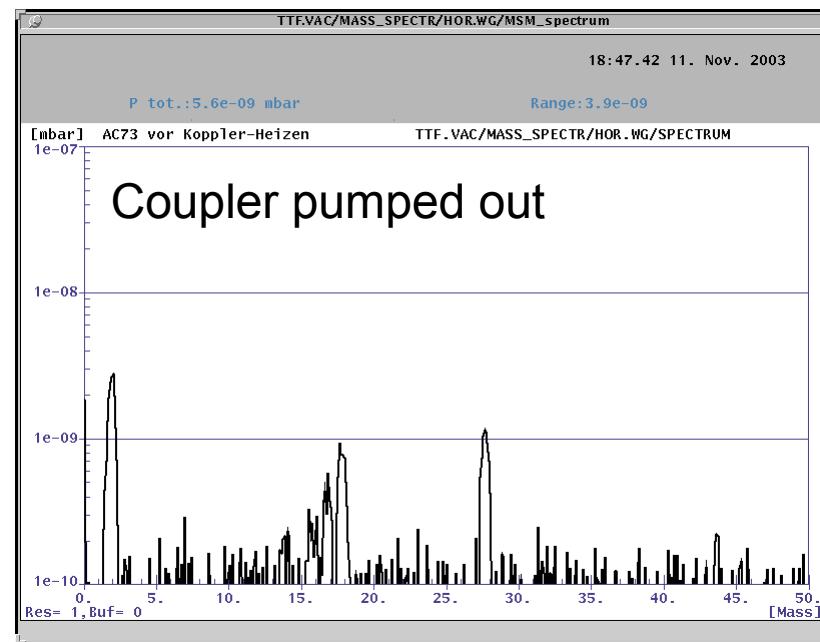


Denis Kostin, MHF/sl, DESY

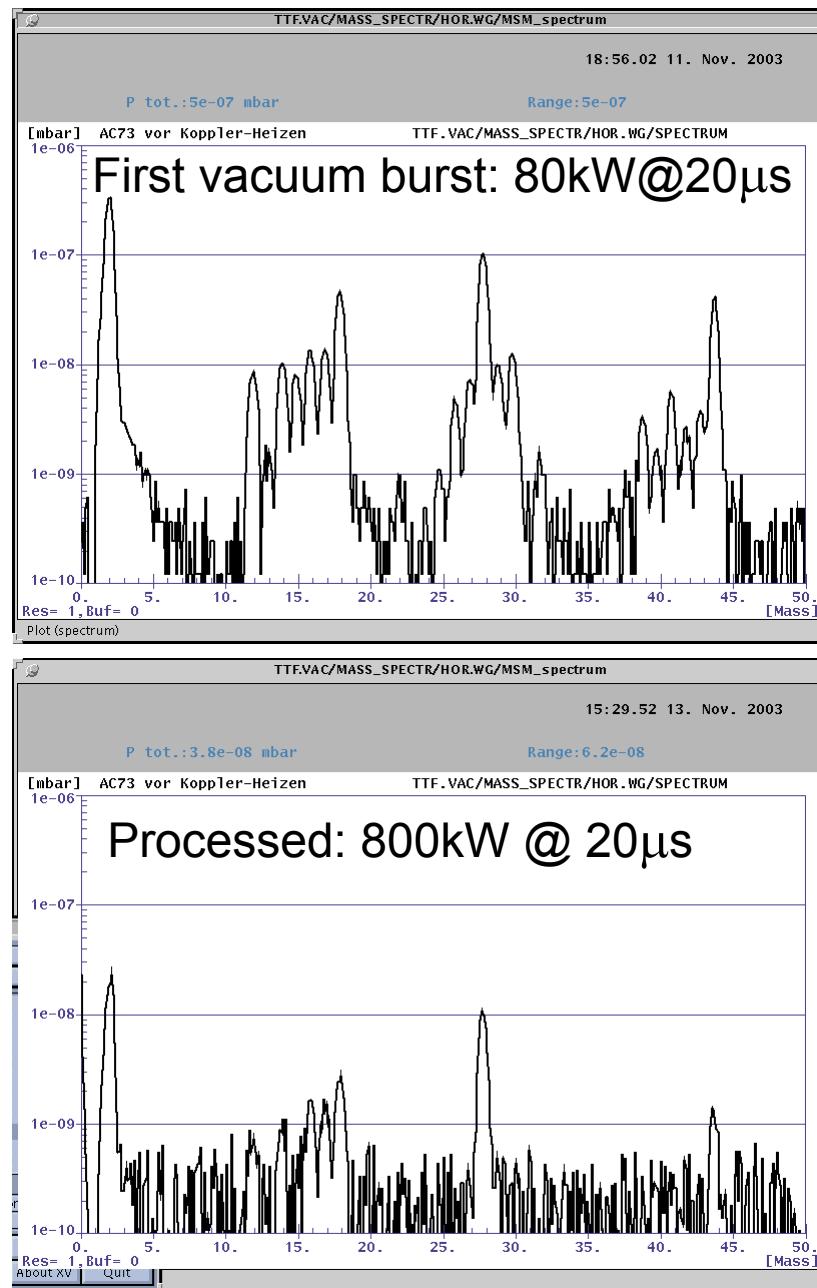


# Mass Spectra (2.7)

TTF III coupler (not baked)

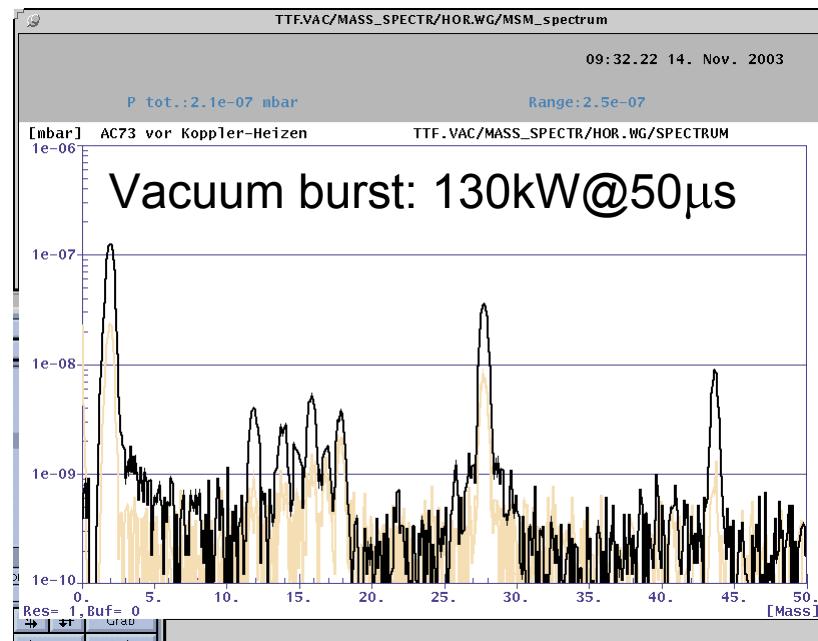


Denis Kostin, MHF/sl, DESY

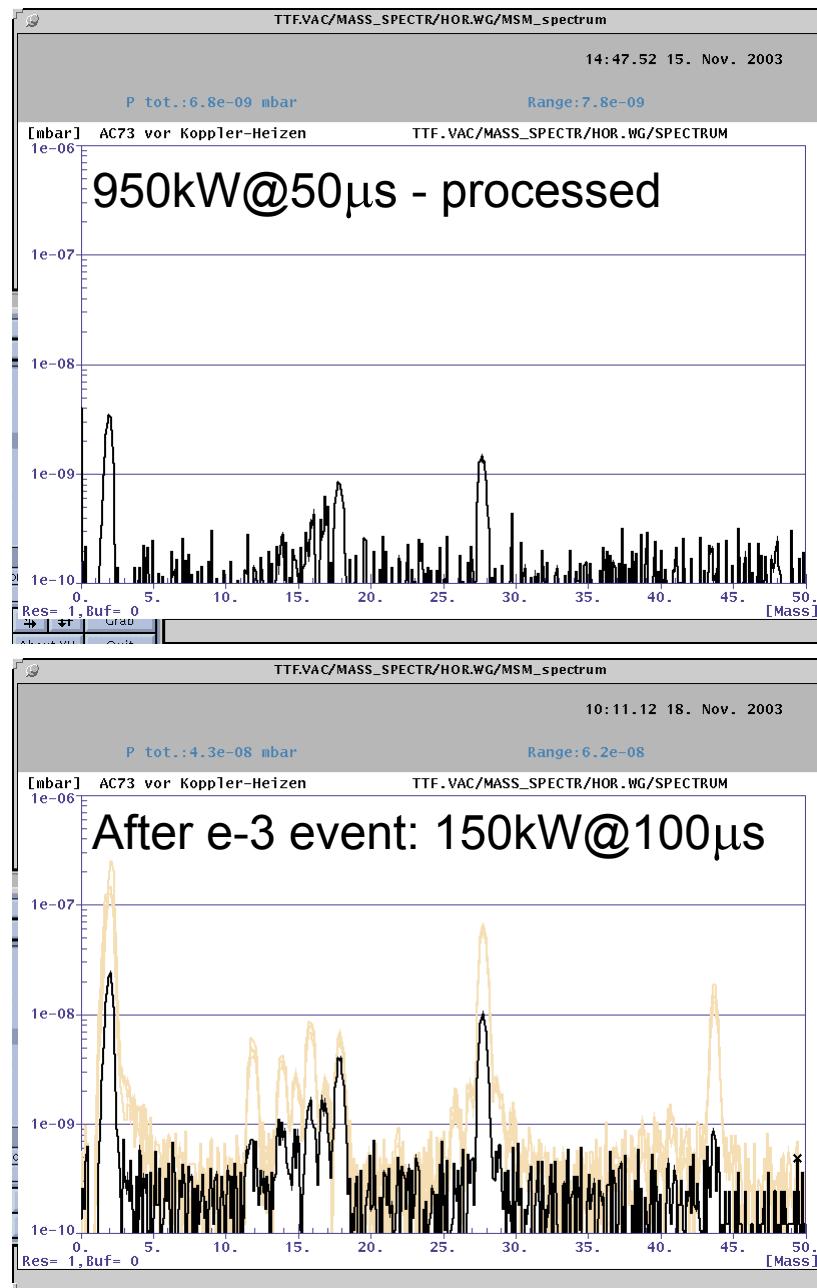


# Mass Spectra (2.8)

TTF III coupler (not baked)

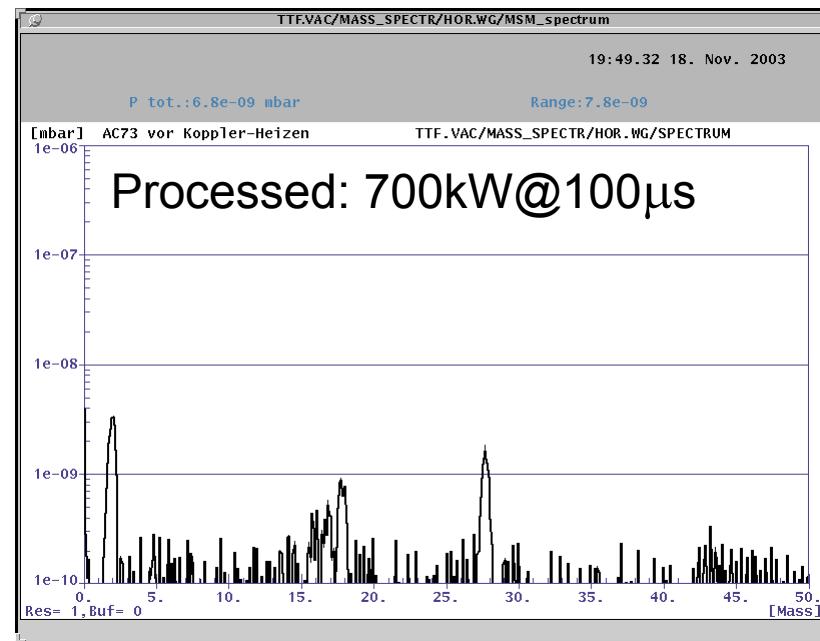


Denis Kostin, MHF/sl, DESY

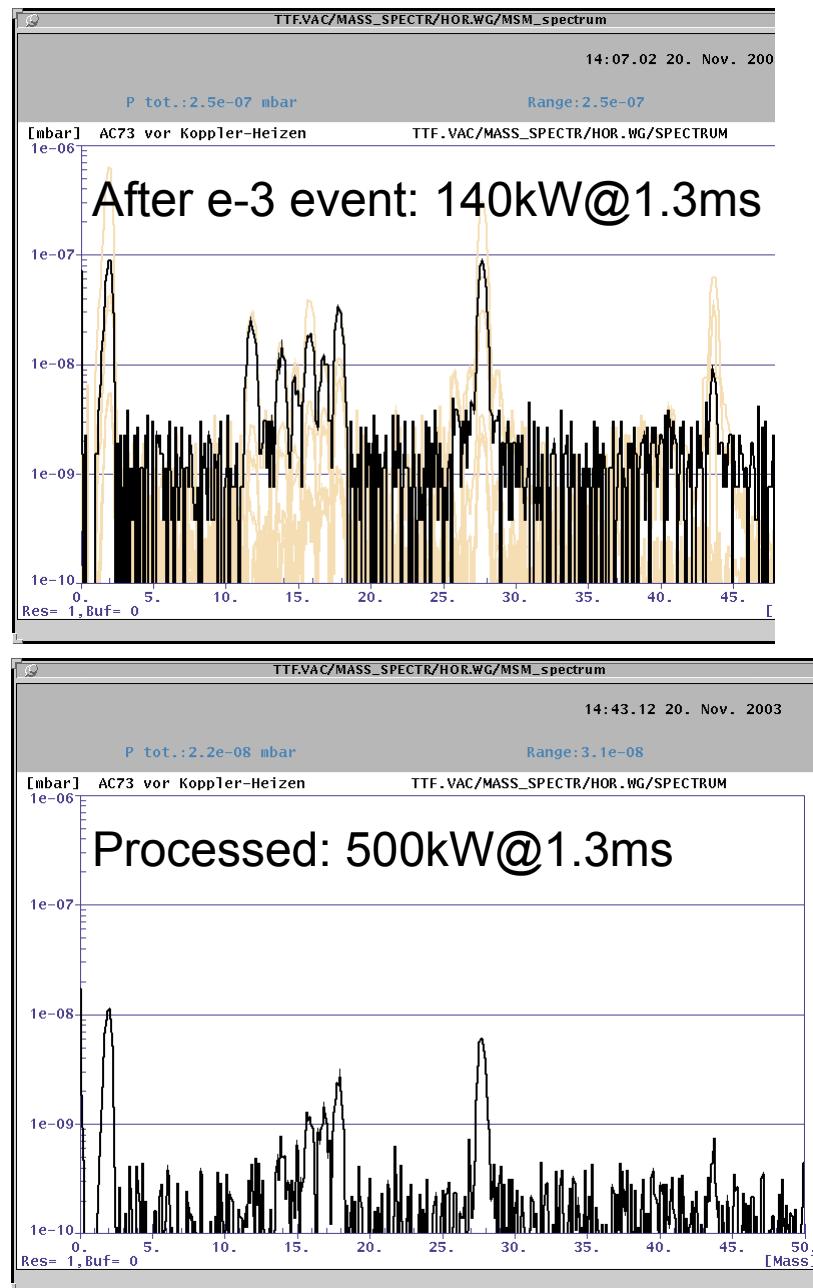


# Mass Spectra (2.9)

TTF III coupler (not baked)

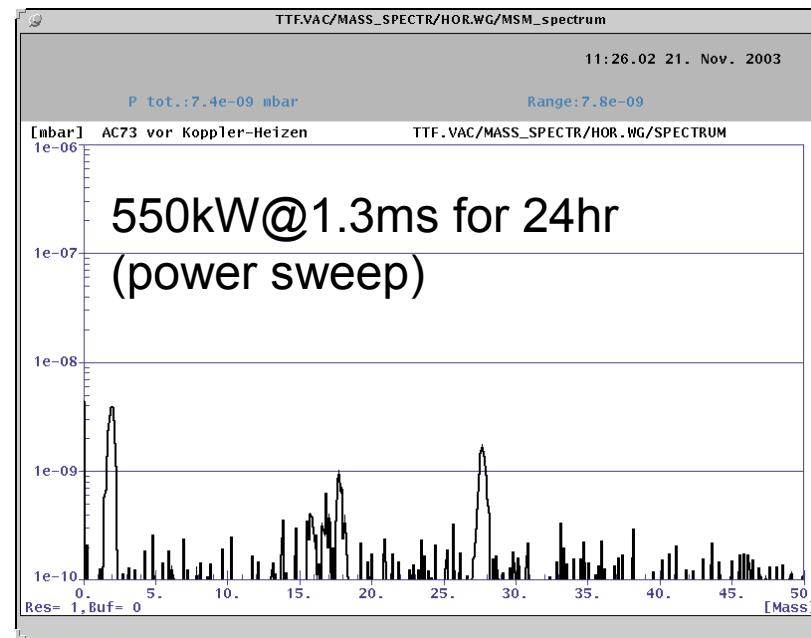


Denis Kostin, MHF/sl, DESY



# Mass Spectra (2.10)

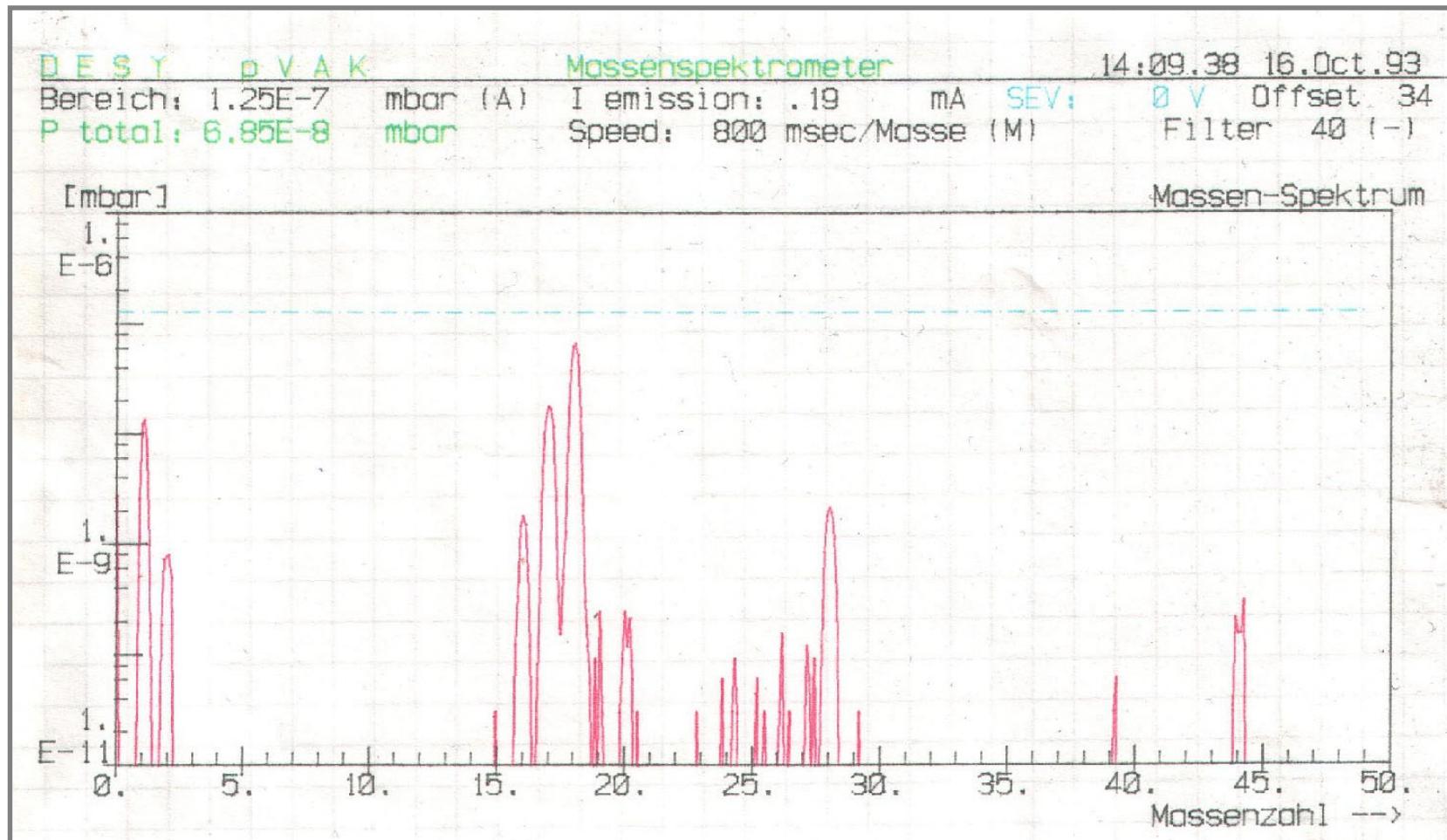
TTF III coupler (not baked)



Denis Kostin, MHF/sl, DESY

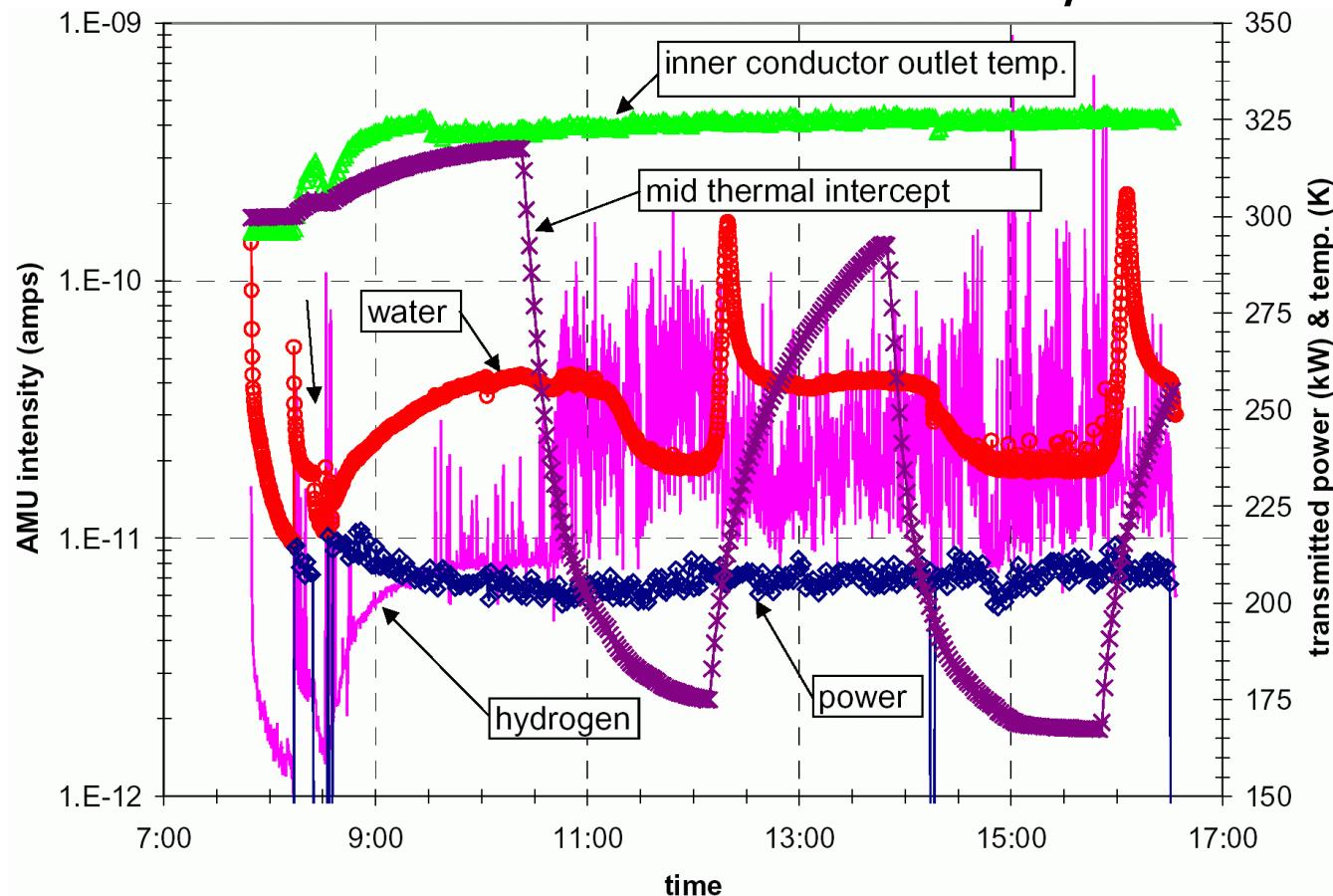
# 3. Accelerating modules @ TTF

C4@ACC3: not processed and not baked



Denis Kostin, MHF/sl, DESY

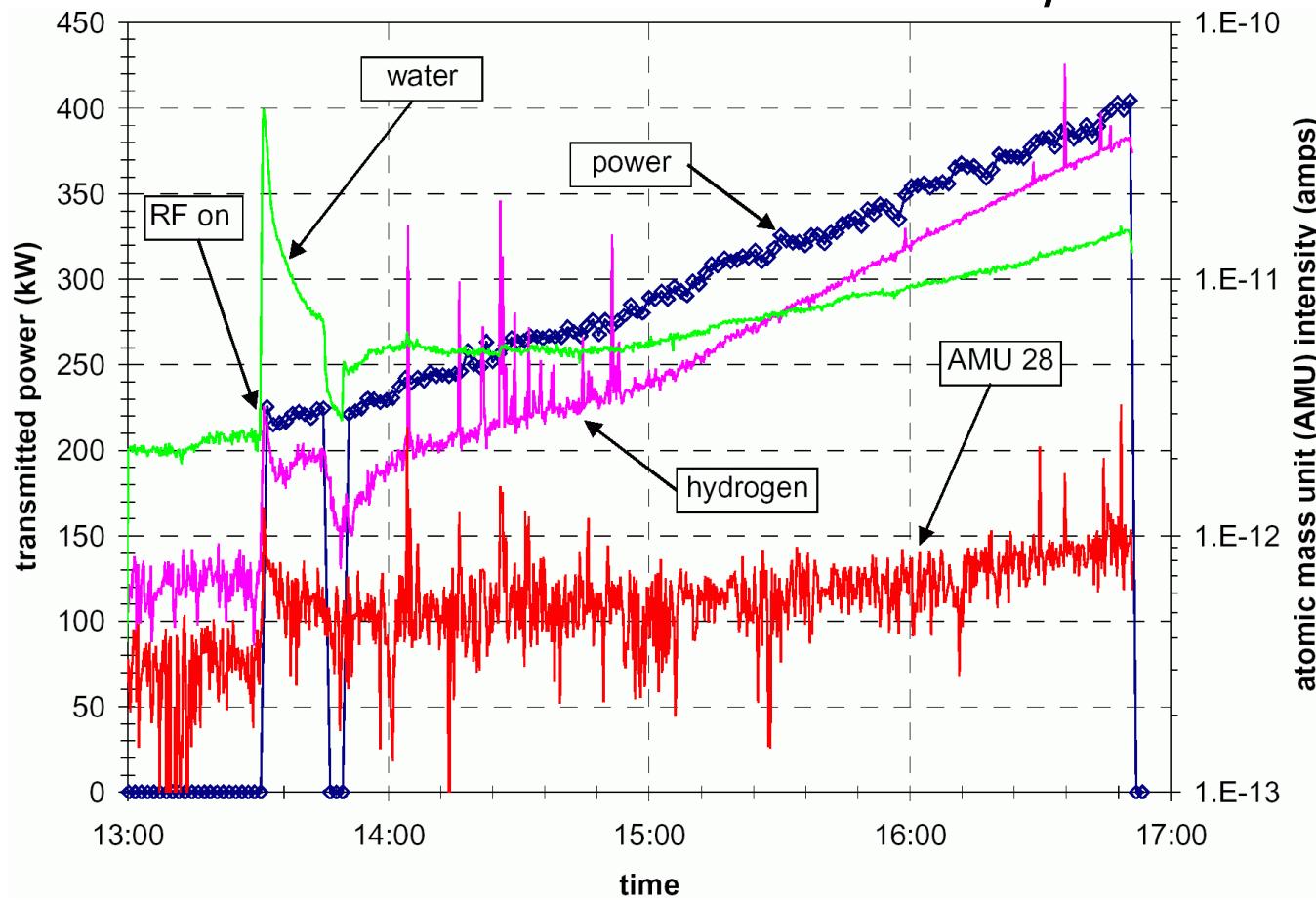
## 4. Other Labs: APT / LANL (1)



Residual gas intensity (hydrogen & water left axis) with transmitted power, mid thermal intercept temperature, and inner conductor outlet coolant temperature (power & temperatures right axis) after 34 hours of testing at 210 kW

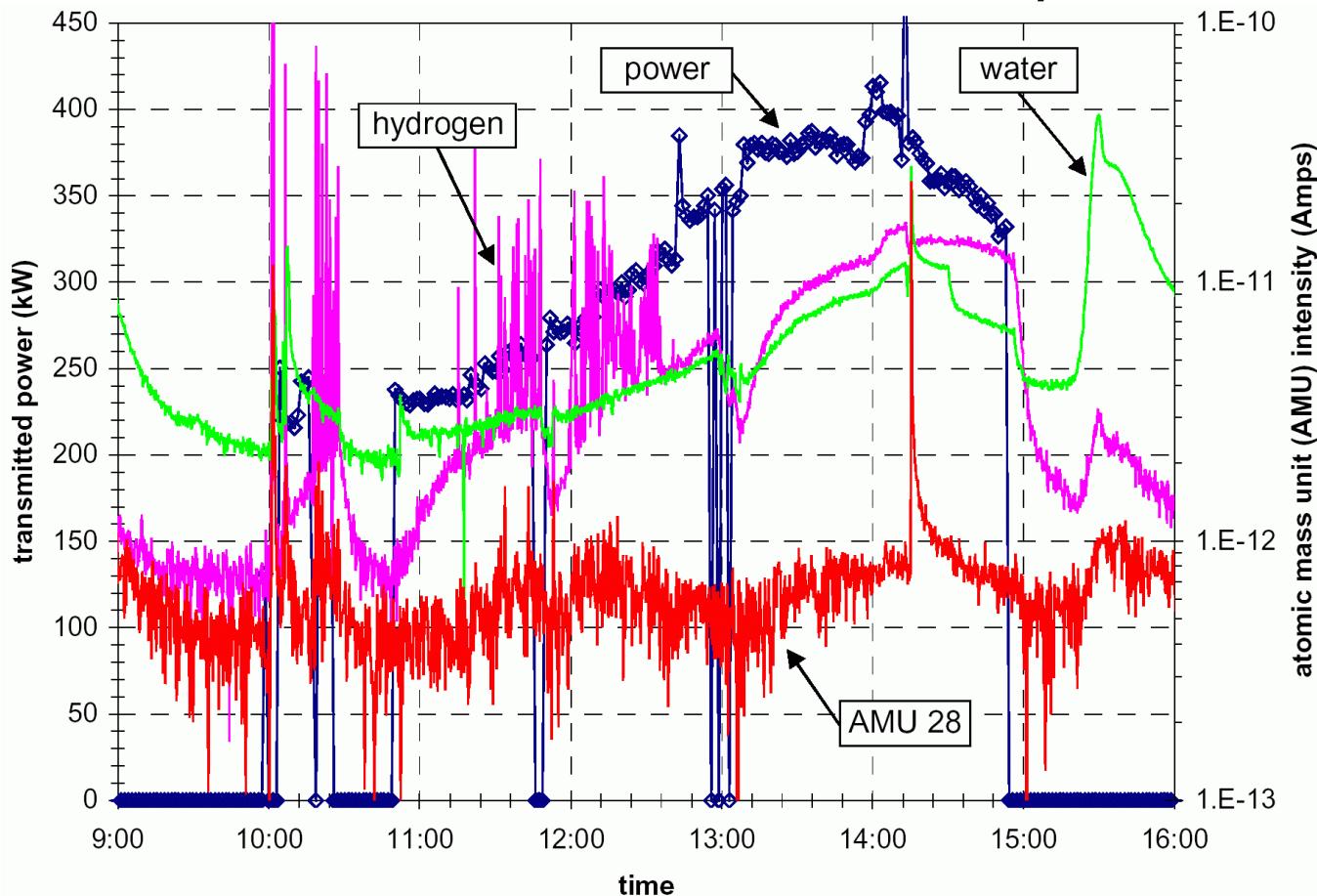
Denis Kostin, MHF/sl, DESY

# Other Labs: APT / LANL (2)



Residual gas magnitude (right axis) and power level (left axis) versus time during a room temperature power level sweep to look for multipacting power levels.

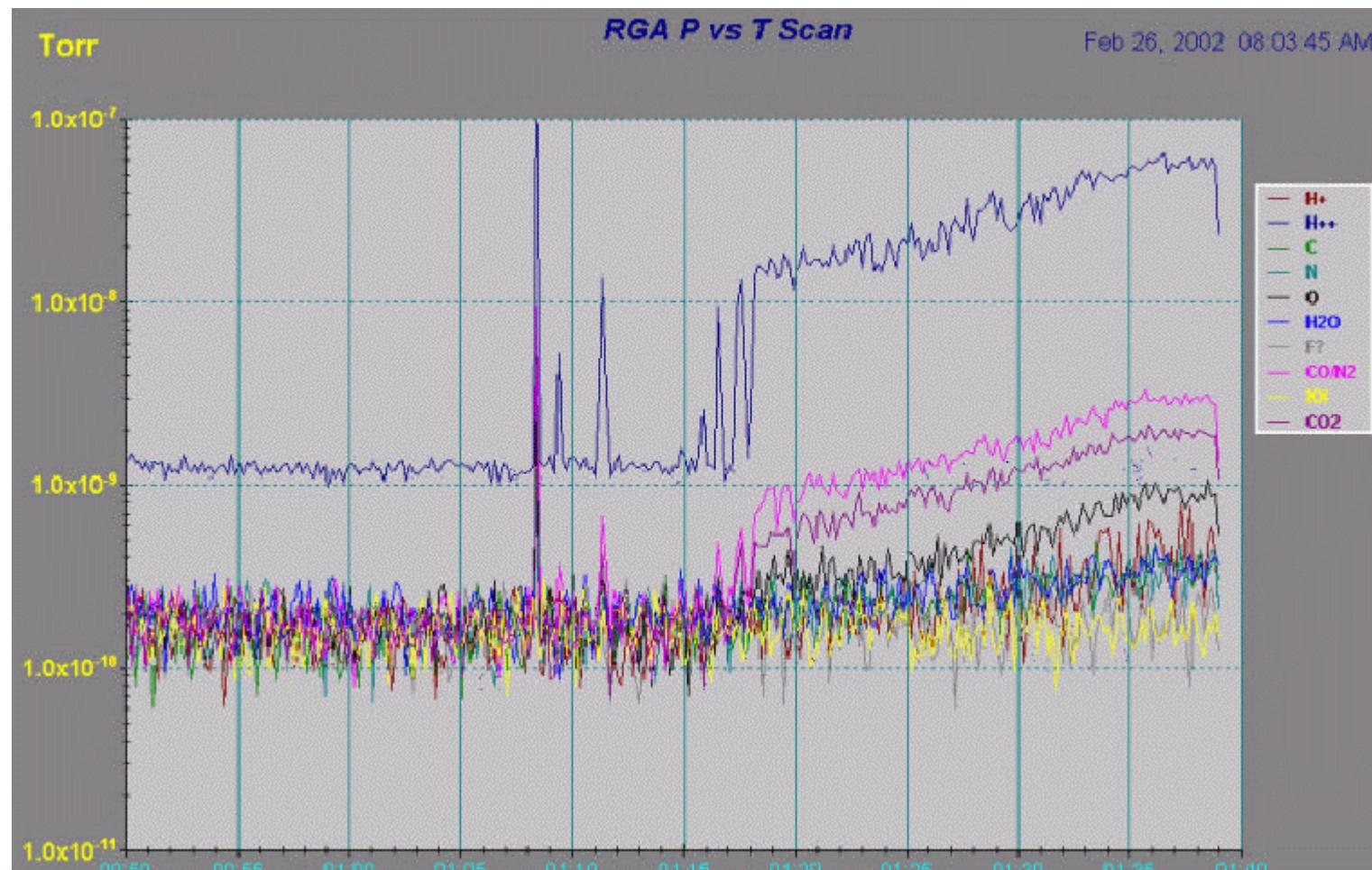
# Other Labs: APT / LANL (3)



Intensity of residual gases and power level versus time  
with liquid nitrogen circulating through thermal intercept.

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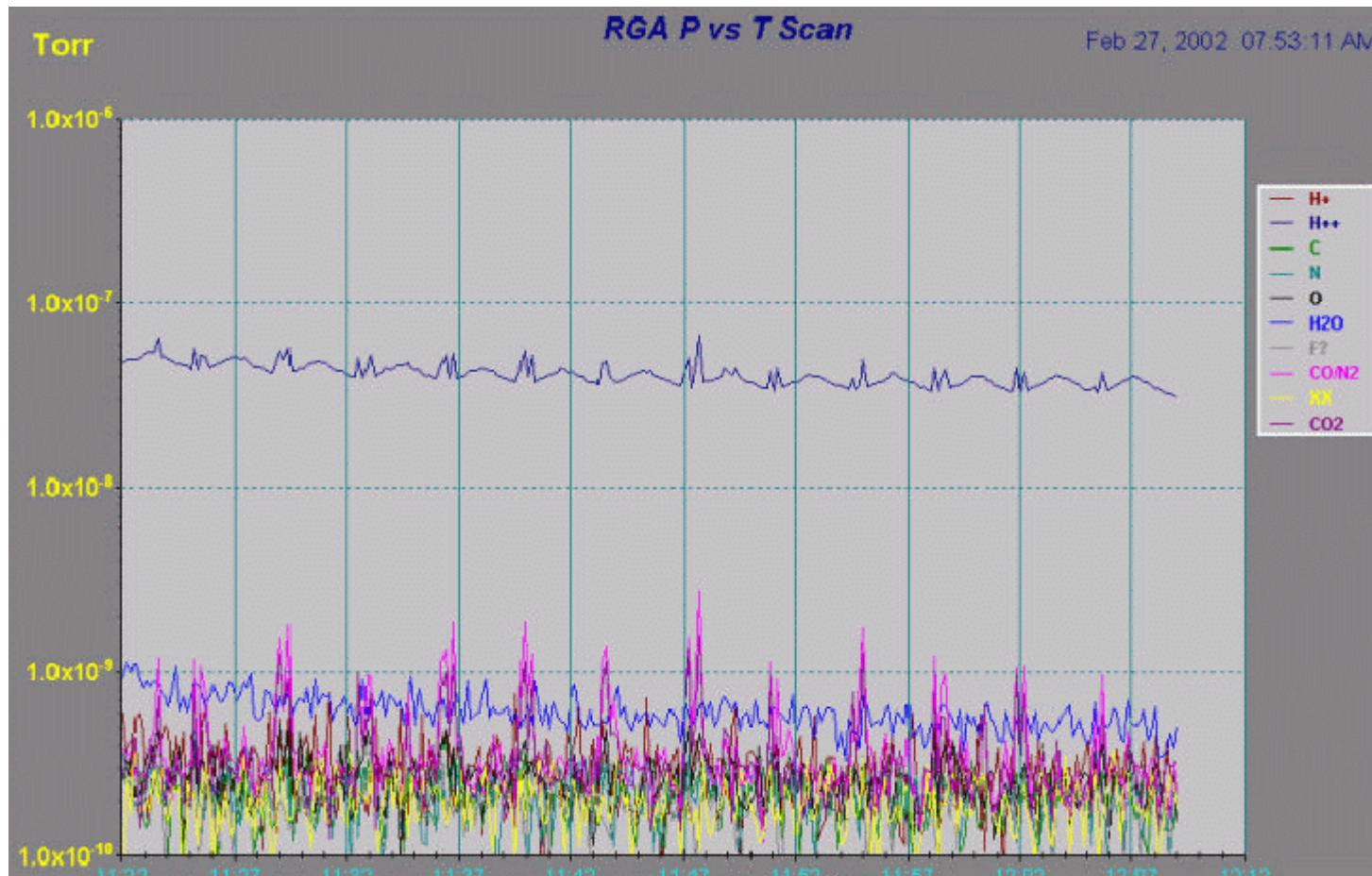
# Other Labs: SNS (1)



40kW. RF processing

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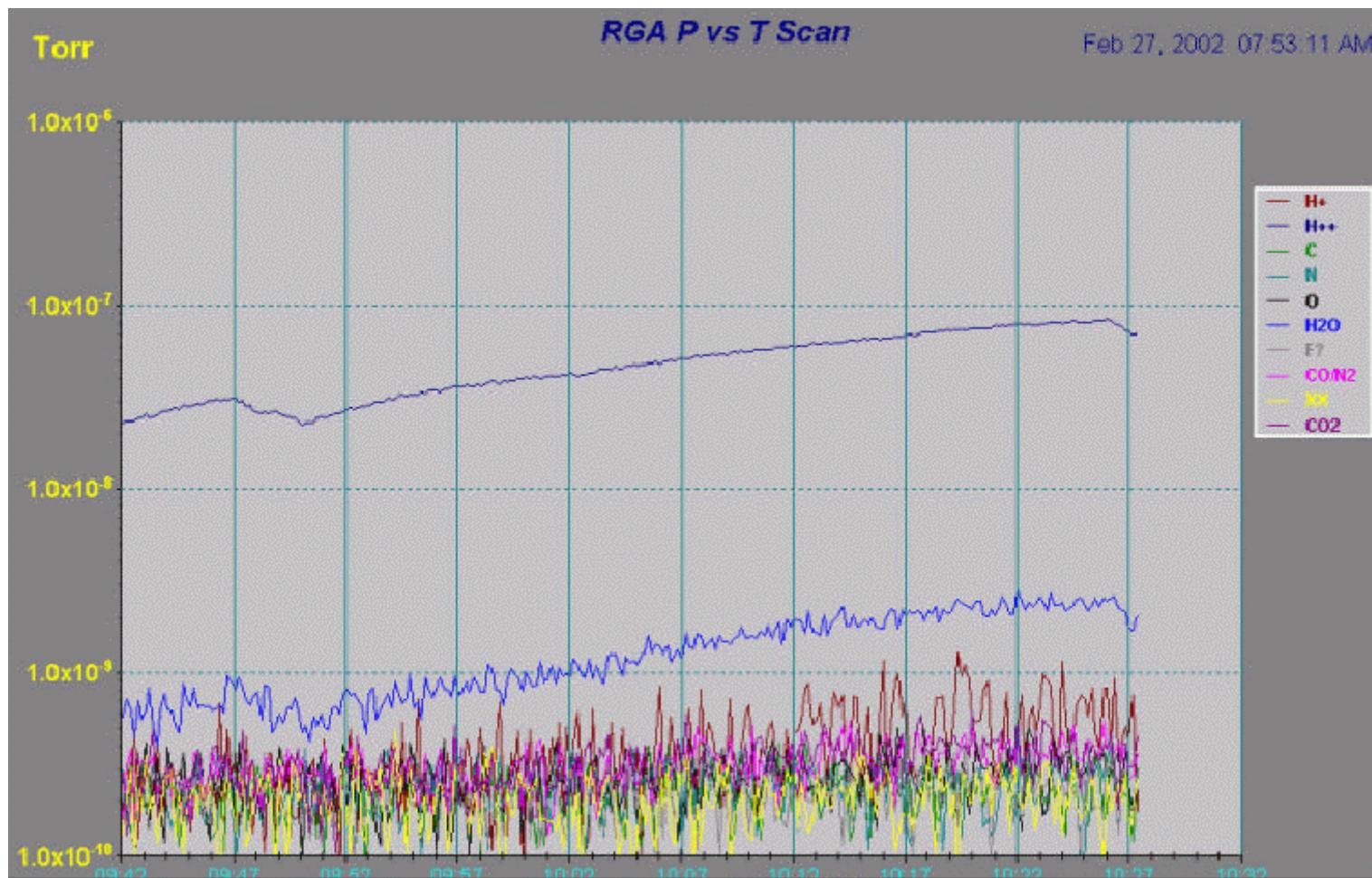
# Other Labs: SNS (2)



RGA while cycling between 10 - 800 kW (1 ms, 60 Hz). No DC bias.

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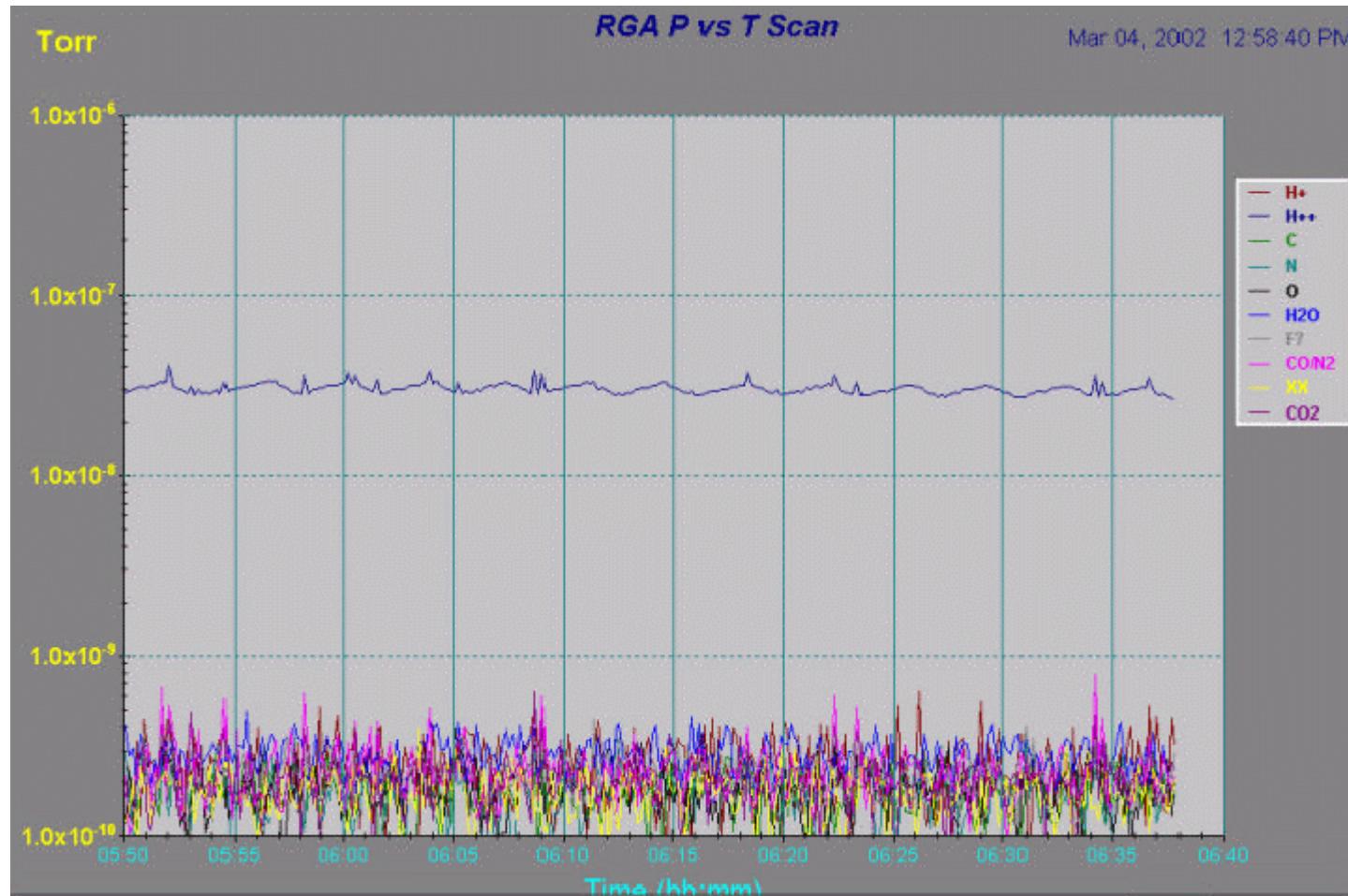
# Other Labs: SNS (3)



RGA recorded while in CW at 600 kW for 45 minutes.

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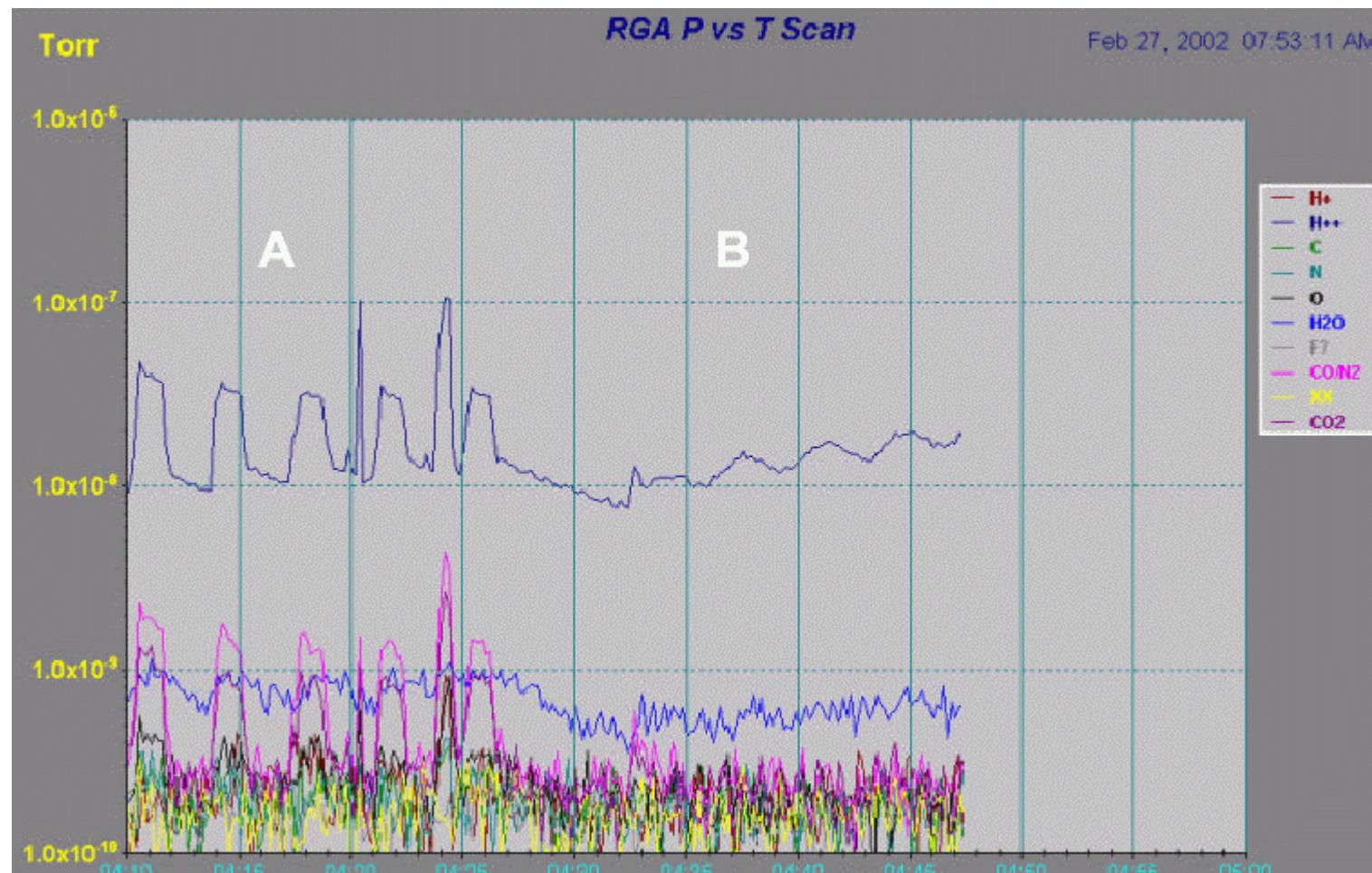
# Other Labs: SNS (4)



RGA while cycling the RF power with one outer conductor cooled down to -50 °C

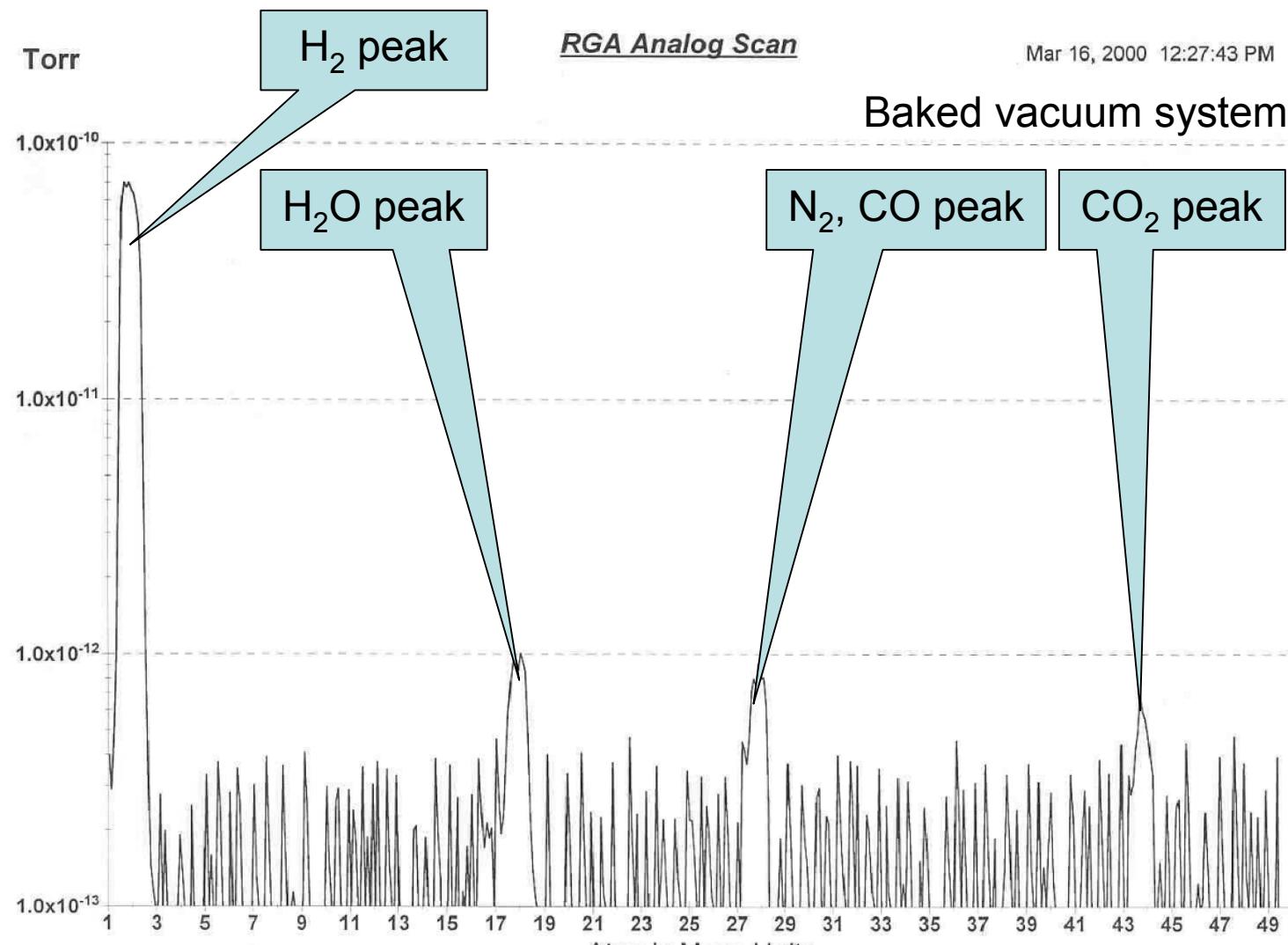
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# Other Labs: SNS (5)



RGA while cycling 10 - 800 kW with DC bias: - A with +2.5 kV - B with -2.5 kV

# Other Labs: SNS (6)



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## 5. Summary

1. A residual gas analyser (RGA) determines water during early stages of conditioning, followed by dominant Hydrogen at a later stage. At a lower level Hydrocarbon and Carbon Oxides are present.
2. Baked coupler shows usually less water content in RGA.
3. Processed coupler RGA shows mostly Hydrogen.